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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/398,502	09/17/1999	HABIB RIAZI	3-11-3	1176

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EXAMINER

DUONG, DUC T

ART UNIT PAPER NUMBER

2616

DATE MAILED: 05/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/398,502	RIAZI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Duc T. Duong	2663	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. In view of the Pre-Appeal Brief filed on April 5, 2006, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sayeed (US Patent 6,594,320 B1) in view of Barton et al (US Patent 6,449,246 B1).

Regarding to claims 1 and 7, Sayeed discloses an orthogonal frequency division multiplexing OFDM transmitter (fig. 1) for transmitting an OFDM signal having a plurality of sub-carriers (col. 4 lines 9-21), comprising a differential encoder 130 for modulating said OFDM signal in the frequency domain using adjacent sub-carriers to produce differentially encoded symbols (fig. 1 col. 4 lines 31-33); an IFFT buffer 140 for storing said differentially encoded symbols and one or more spectral null to produce an analog signal centered at a desired carrier frequency (fig. 4a-c col. 4 lines 36-60); and a transformer 150 for creating said OFDM signal (fig. 1 col. 5 lines 61-65).

Sayeed fails to teach for storing pilot tones.

However, Barton discloses a multicarrier access communication system, wherein pilot tones are used as null symbols (col. 11 lines 48-50).

Thus, it would have been obvious to a person of ordinary skill in the art, at the time of the invention, to employ pilot tones as null symbols as taught by Barton in Sayeed's system for performing symbol timing and carrier frequency offset estimation.

Regarding to claims 2 and 8, Sayeed discloses the transformer 150 implements an Inverse Fast Fourier Transform (fig. 1 col. 5 lines 6-8).

Regarding to claims 3 and 9, Sayeed discloses the transformer 150 implements an orthogonal transformation (it is inherent in OFDM system the transformer implements an orthogonal transformation).

Regarding to claims 4 and 10, Sayeed discloses the transformer 150 generates said OFDM signal with a plurality of sub-carriers for carrying data (fig. 1 col. 4 lines 36-55).

Regarding to claims 5 and 11, Sayeed discloses at least one unmodulated sub-carrier (spectral null) generated by said transforming step is allocated as a pilot bin to provide a reference within each OFDM symbol (fig. 4a col. 4 lines 39-42).

Regarding to claims 6 and 12, Sayeed discloses the differential encoding 130 is performed with respect to consecutive sub-carriers in said OFDM system (fig. 2 col. 4 lines 31-33; noted the equation deriving the complex elements suggest of consecutive sub-carriers processing).

Regarding to claims 13 and 18, Sayeed discloses an orthogonal frequency division multiplexing OFDM receiver (fig. 20 for receiving an OFDM signal having a plurality of sub-carriers (col. 5 lines 39-46), comprising a transformer 220 for recovering said OFDM signal having a plurality of sub-carriers (fig. 2 col. 5 lines 46-48), wherein said recovered signal contains differentially encoded symbols and one or more pilot tones and wherein said recovered signal is centered at a desired carrier frequency (fig. 4a-c col. 5 lines 48-50); and a differential decoder 230 for demodulating said OFDM signal in the frequency domain wherein said differential decoding is performed using adjacent sub-carriers (fig. 2 col. 5 lines 51-55).

Sayeed fails to teach for storing pilot tones.

However, Barton discloses a multicarrier access communication system, wherein pilot tones are used as null symbols (col. 11 lines 48-50).

Thus, it would have been obvious to a person of ordinary skill in the art, at the time of the invention, to employ pilot tones as null symbols as taught by Barton in Sayeed's system for performing symbol timing and carrier frequency offset estimation.

Regarding to claims 14 and 19, Sayeed discloses the transformer 220 implements a Fast Fourier Transform (fig. 2 col. 5 lines 46-48).

Regarding to claims 15 and 20, Sayeed discloses the transformer 220 implements an orthogonal transformation (it is inherent in OFDM system the transformer implements an orthogonal transformation).

Regarding to claims 16 and 21, Sayeed discloses at least one unmodulated sub-carrier (spectral null) generated by said transforming step is allocated as a pilot bin to provide a reference within each OFDM symbol (fig. 4a col. 4 lines 39-42).

Regarding to claims 17 and 22, Sayeed discloses the differential decoding 230 is performed with respect to consecutive sub-carriers in said OFDM system (fig. 2 col. 4 lines 31-33; noted the equation deriving the complex elements suggest of consecutive sub-carriers processing).

### ***Conclusion***


4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Duong whose telephone number is 571-272-3122. The examiner can normally be reached on M-F (9:00 AM-6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy D. Vu can be reached on 571-272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2616

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DD



**HUY D. VU**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**